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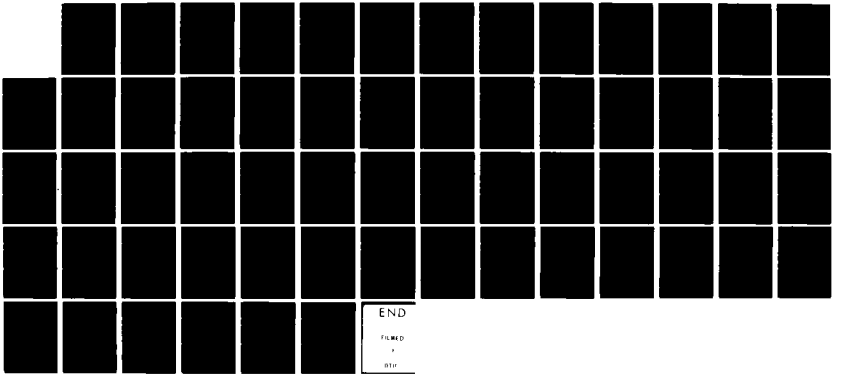

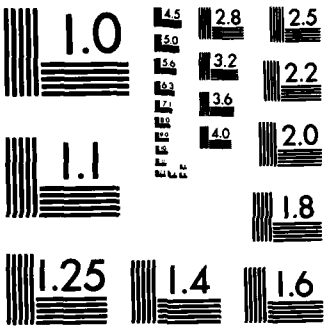

# INM
# Integrated Noise Model Version 3
# Installation Instructions

US Department of Transportation
Federal Aviation Administration



FAA-EE-81-18

October 1982

Prepared by:
CACI, Inc.-Federal
For the Office of
Environment and Energy

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15. Supplementary Notes

16. Abstract

This document provides the necessary instructions for programming personnel to install Integrated Noise Model (INM) Version 3 on the CDC 6000, Cyber 170 or IBM S/360-370 computers. INM Version 3 is the state-of-the-art computer tool for determining the total impact of aircraft noise at and around ariports. This manual describes the model history, the model components, the hardware and software requirements, the characteristics of the model release tapes, the installation procedures and the execution procedures.

INM Version 3 supersedes Version 2 which was released in September 1979. This document replaces "INM, Integrated Noise Model, Version 2, Installation Instructions" (Report No. FAA-EE-80-50).

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# INM
# INTEGRATED NOISE MODEL
# VERSION 3
# INSTALLATION INSTRUCTIONS

November 30, 1981



A

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# 1.0 INTRODUCTION

Version 1 of the Integrated Noise Model (INM) was released in January 1978 by the Federal Aviation Administration (FAA). The model was originally developed to provide aviation specialists and airport planners with an analysis tool to assist in assessing the impact of aircraft noise in the vicinity of airports. Since its first public release, the model has been used extensively in several major airport studies. It has, in fact, become the recommended tool to generate site analysis for Airport Noise Control and Land Use Compatibility Planning (ANCLUC) studies.

Version 2 of the INM, released in September 1979, included modifications to expand the actual modeling capabilities and to improve the overall ease of use of the INM. Some of these modifications were based on recommendations made by interested parties such as the Air Transport Association (ATA) and Airport Operation's Council International (AOCI). In particular, Version 2 of the model included:

- o an expanded data base of aircraft noise and performance
- o additional user selection for input data, e.g. noise curve data, takeoff profiles, approach parameters and additional aicraft types
- o improved documentation
- o additional modules, including an interactive conversational input module, an input data verifier and a data base printing program.

Version 3 of the INM is a state-of-the-art tool for determining the total impact of aircraft noise at and around airports. Although Version 3 uses much of the methodology of Version 2, it is essentially a new model in terms of actual program code. The new model is written in ANSI FORTRAN machine-independent, fully-documented code which is highly portable across major computer systems. Version 3 incorporates into one model a number of modules whose functions were performed by separate programs in Version 2.

Version 3 offers substantial improvements over Version 2. Most importantly, it contains a more proficient method of calculating noise contours with the replacement of the point search technique with a grid mapping technique. This version also includes:

- o an updated and expanded data base of aircraft noise and performance
- o a new input processor which accepts keyword free format input and allows for numerous new options for organizing input data
- o a verifier option to determine whether the input information is logically consistent with both the data base and the computational methods
- o an option to preview flight information through the generation of a plot
- o a revised algorithm for lateral attenuation
- o a simple and straightforward method of simulating "touch-and-go" types of operations
- o an algorithm to account for the effect of wind force and direction on aircraft performance
- o an improved and expanded report generating system.

The FAA currently provides the INM user commmunity and the general public with a package for installing Version 3.8 (Version 3 of the model with Data Base No. 8) on the CDC and IBM computer systems. This package provides a version of the INM which is portable for CDC and IBM hardware while maintaining the source code on a CDC computer system utilizing the UPDATE feature. Future plans include expanding the package for the HIS and UNIVAC computer systems. In addition, the model will be converted for used on the DEC 10 system.

The purpose of this Installation Instructions manual is to provide the information necessary for computer personnel to install the INM on each of the computer systems for which it is available. The manual describes the model history, available documentation and the model components. In addition, for each computer system, the manual describes the hardware and software requirements, the installation procedures, the execution procedures and computer system documentation.

## 1.1 MODEL CAPABILITIES AND OUTPUTS

The INM determines the impact of aircraft noise at or around airports. The model will compute noise exposure values for the following noise metrics:

- o Noise Exposure Forecast (NEF), a weighted measure based on effective perceived noise decibel (EPNdB) as the unit of aircraft noise;
- o Equivalent Sound Level (Leq), an energy summation of the aggregate noise environment as measured in A-weighted decibel units (dBA);
- o Day-Night Average Sound Level (Ldn), based on Leq, with nighttime operations weighted by a penalty;
- o Community Noise Equivalent Level (CNEL), similar to Ldn with a penalty for early evening hours of operation;

The model performs the following types of analyses:

- o A grid analysis reflecting the values of selective noise metrics at user-specified locations in the airport vicinity. The results are presented as a tabular report (see Figure 1). In addition, a detailed report may be obtained (see Figure 2).
- o A contour analysis locating contours of equal noise impact. The resulting contours can be graphically produced on a CalComp plotter, if available, or the data for all points can be presented in tabular form (see Figures 3 and 4). In addition, a tabular report of populations within the contour areas may be obtained (see Figure 5). This last report is called the Population Impact Report.

The model also produces a number of supporting reports. For example, the ECHO Reports present the User Input Data in tabular format, the Verifier Report notifies the user of inconsistencies in the input data, and the Data Base Print Report presents selected portions of the INM data base in tabular format. In addition, without performing grid or contour analyses of the input data, the model can produce PREVIEW plots of the input scenario flights. All of these reports aid the user in developing an accurate scenario of input data.

INTEGRATED NOISE MODEL - STANDARD GRID ANALYSIS REPORT



ANNUAL AVERAGE EXPOSURE AT AN EXAMPLE OF A MEDIUM HUB AIRPORT

AIRPORT - EXAMPLE (MHA)

| X | Y | NEF | LDN | TA | X | Y | NEF | LDN | TA |
|---|---|---|---|---|---|---|---|---|---|
| | | (DBA THRESHOLD = 65.0 ) | | | | | (DBA THRESHOLD = 65.0 ) | | |
| -3000. | 1500. | 36.8 | 71.4 | 18.0 | -2000. | 1500. | 36.6 | 71.2 | 18.7 |
| -3000. | 2200. | 32.8 | 67.8 | 7.3 | -2000. | 2200. | 32.6 | 67.6 | 8.6 |
| -3000. | 2900. | 29.5 | 64.9 | 3.7 | -2000. | 2900. | 29.4 | 64.8 | 3.7 |

Figure 1

STANDARD GRID ANALYSIS REPORT

INTEGRATED NOISE MODEL - DETAILED GRID ANALYSIS REPORT 

X = 11000. Y = 3000.

METRIC LEQ TOTAL = 67[illegible]

| AIRCRAFT | PROFILE | MOD | APPROACH PARAM | NOISE CURVE | STAGE | T AND G APPROACH | FLIGHT TYPE | TRACK | RUNWAY | SEL | OPERATIONS DAY | EVENING | NIGHT | CONTRIBUTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 727200 | TOP117 | 0 | AP20 | 3JT8D | 1 | | T | TR3 | 09R | 97.1 | 21.0 | 0.0 | 2.5 | 0.61442E+02 |
| DC930 | TOP155 | 0 | AP30 | 2JT8D | 1 | | T | TR3 | 09R | 94.9 | 26.5 | 0.0 | 0.5 | 0.59838E+02 |
| DC930 | TOP155 | 1 | AP30 | 2JT8D | 1 | | T | TR1 | 09L | 90.4 | 26.5 | 0.0 | 0.5 | 0.55326E+02 |
| 707320 | TOP39 | 0 | AP7 | JT3D | 2 | | T | TR3 | 09R | 96.7 | 3.5 | 0.0 | 1.0 | 0.53850E+02 |
| DC930 | TOP156 | 1 | AP30 | 2JT8D | 2 | | T | TR1 | 09L | 89.9 | 8.0 | 0.0 | 0.5 | 0.49774E+02 |
| DC930 | TOP157 | 0 | AP30 | 2JT8D | 3 | | T | TR3 | 09R | 95.7 | 1.5 | 0.0 | 0.0 | 0.48049E+02 |
| 727200 | TOP117 | 1 | AP20 | 3JT8D | 1 | | T | TR1 | 09L | 90.7 | 3.0 | 0.0 | 0.5 | 0.46752E+02 |
| 707320 | TOP42 | 0 | AP7 | JT3D | 5 | | T | TR3 | 09R | 97.6 | 0.5 | 0.0 | 0.0 | 0.45186E+02 |
| 727200 | TOP118 | 0 | AP20 | 3JT8D | 2 | | T | TR2 | 27R | 86.7 | 4.4 | 0.0 | 1.4 | 0.44975E+02 |
| 707320 | TOP41 | 0 | AP7 | JT3D | 4 | | T | TR2 | 27R | 87.3 | 2.5 | 0.0 | 0.0 | 0.41926E+02 |
| DC930 | TOP157 | 1 | AP30 | 2JT8D | 3 | | T | TR1 | 09L | 89.5 | 1.5 | 0.0 | 0.0 | 0.41819E+02 |

HIGHEST LEVEL = 97.6

| | DECIBELS BELOW 98 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 |
| NUMBER OF FLIGHTS - | 6 | 2 | 2 | 1 | 0 | 0 | 0 | 2 | 3 | 0 |
| NUMBER OF OPERATIONS DAY - | 49 | 6 | 10 | 27 | 0 | 0 | 0 | 30 | 12 | 0 |
| EVENING- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NIGHT - | 7 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |



Figure 2

DETAILED GRID ANALYSIS REPORT

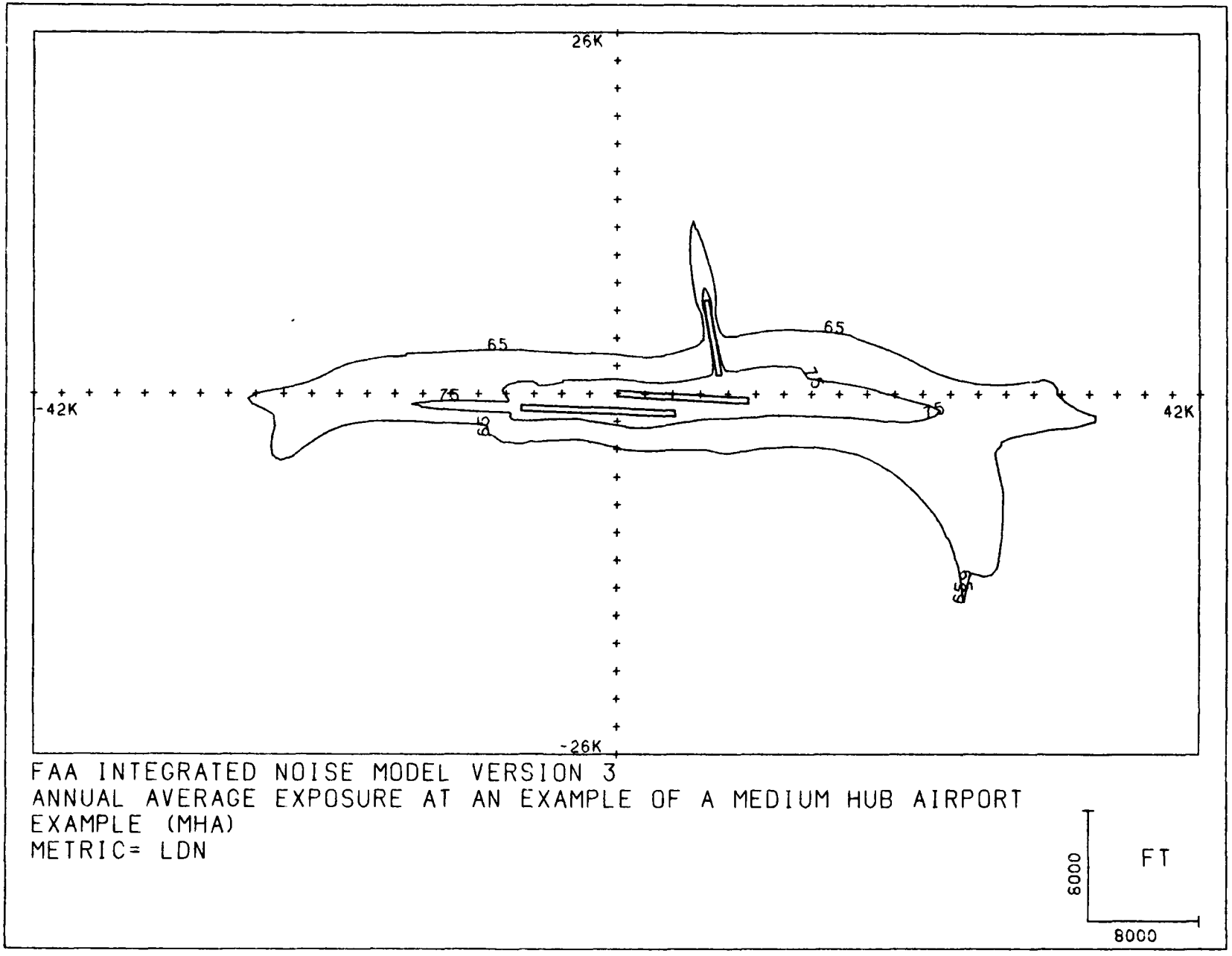


Figure 3

SAMPLE CONTOUR PLOT

INTEGRATED NOISE MODEL - CONTOUR ANALYSIS REPORT 

C O N T O U R - CASE1

ANNUAL AVERAGE EXPOSURE AT AN EXAMPLE OF A MEDIUM HUB AIRPORT
AIRPORT - EXAMPLE (MHA)
LEVEL = 65.0 DB AREA = 14.78 METRIC = LIN

| ISLAND | PNT | X | Y | PNT | X | Y | PNT | X | Y |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 25000. | -14996. | 2 | 25423. | -12923. | 3 | 26351. | -13151. |
| | 4 | 26968. | -13040. | 5 | 27385. | -12567. | 6 | 27400. | -12500. |
| | 7 | 27515. | -11890. | 8 | 27548. | -11719. | 9 | 27567. | -11496. |
| | 10 | 27661. | -10937. | 11 | 27724. | -10537. | 12 | 27746. | -10156. |
| | 13 | 27753. | -9747. | 14 | 27778. | -9375. | 15 | 27800. | -9050. |
| | 16 | 27799. | -8594. | 17 | 27795. | -8142. | 18 | 27816. | -7812. |
| | 19 | 27801. | -7488. | 20 | 27779. | -7031. | 21 | 27719. | -6656. |
| | 22 | 27627. | -6250. | 23 | 27452. | -5577. | 24 | 27433. | -5469. |
| | 25 | 27427. | -5385. | 26 | 27344. | -4968. | 27 | 27281. | -4687. |
| | 28 | 27269. | -4613. | 29 | 27208. | -4229. | 30 | 27388. | -3951. |
| | 31 | 27631. | -3699. | 32 | 27673. | -3454. | 33 | 28125. | -3214. |
| | 34 | 28184. | -3184. | 35 | 28304. | -3125. | 36 | 28906. | -2988. |
| | 37 | 29436. | -2873. | 38 | 29687. | -2836. | 39 | 30030. | -2783. |
| | 40 | 30469. | -2698. | 41 | 30771. | -2646. | 42 | 30971. | -2595. |
| | 43 | 31250. | -2553. | 44 | 31439. | -2532. | 45 | 31641. | -2509. |
| | 46 | 31889. | -2486. | 47 | 32031. | -2473. | 48 | 32150. | -2463. |
| | 49 | 32422. | -2435. | 50 | 32762. | -2395. | 51 | 32812. | -2389. |
| | 52 | 32853. | -2384. | 53 | 33080. | -2344. | 54 | 33203. | -2306. |
| | 55 | 33477. | -2227. | 56 | 33594. | -2178. | 57 | 33830. | -2107. |
| | 58 | 33984. | -2068. | 59 | 34083. | -2052. | 60 | 34375. | -1967. |
| | 61 | 34416. | -1953. | 62 | 34424. | -1612. | 63 | 34421. | -1562. |
| | 64 | 34385. | -1552. | 65 | 34375. | -1549. | 66 | 34354. | -1541. |
| | 67 | 33908. | -1409. | 68 | 33594. | -1295. | 69 | 33385. | -1199. |
| | 70 | 33231. | -1144. | 71 | 32812. | -885. | 72 | 32627. | -781. |
| | 73 | 32266. | -546. | 74 | 32031. | -318. | 75 | 31663. | 0. |
| | 76 | 31668. | 418. | 77 | 31362. | 781. | 78 | 31250. | 875. |
| | 79 | 30738. | 1051. | 80 | 30469. | 989. | 81 | 30337. | 913. |
| | 82 | 29687. | 878. | 83 | 29004. | 781. | 84 | 28920. | 767. |
| | 85 | 28906. | 769. | 86 | 28895. | 770. | 87 | 28125. | 679. |
| | 88 | 27476. | 649. | 89 | 27408. | 653. | 90 | 27344. | 656. |
| | 91 | 27283. | 660. | 92 | 27227. | 665. | 93 | 26562. | 682. |
| | 94 | 25805. | 758. | 95 | 25792. | 759. | 96 | 25781. | 761. |
| | 97 | 25772. | 762. | 98 | 25764. | 764. | 99 | 25648. | 781. |
| | 100 | 25000. | 905. | 101 | 24475. | 1037. | 102 | 24219. | 1100. |
| | 103 | 23755. | 1245. | 104 | 23437. | 1343. | 105 | 23277. | 1402. |
| | 106 | 22833. | 1562. | 107 | 22656. | 1639. | 108 | 22184. | 1872. |
| | 109 | 21875. | 2013. | 110 | 21585. | 2184. | 111 | 21159. | 2409. |
| | 112 | 20812. | 2790. | 113 | 19526. | 3125. | 114 | 18994. | 3369. |



Figure 5 CONTOUR ANALYSIS REPORT

ANNUAL AVERAGE EXPOSURE AT AN EXAMPLE OF A MEDIUM HUB AIRPORT
EXAMPLE (MHA)

POPULATION IMPACT REPORT

METRIC
AIMP

LDN

| CONTOUR LEVEL | RESIDENCES | POPULATION |
|---|---|---|
| 65.00 | 2775 | 9029 |

0 WARNING MESSAGES WERE PRODUCED BY THE IMPACT MODULE



Figure 5

POPULATION IMPACT REPORT

Detailed explanations of the model outputs and additional examples are contained in the User's Guide. This manual should be studied thoroughly by all prospective users.

## 1.2 AVAILABILITY

The INM version 3.8 package is currently available on CDC and IBM release tapes. The essential components required to operate the INM are:

- o The INM Data Base (included in the INM package)
- o The Census Tape (included in the INM package)
- o Airport characteristics and flight information (provided by the user).
- o The computer programs for the preprocessors (included in the INM package)
- o The computer program for the Model Program (included in the INM package)

The INM components are described in Section 3.0. Specific hardware and software requirements for model operation are contained in Sections 4.1 and 5.1.

The INM is available to users through the Office of Environment and Energy of the FAA. A loan agreement is required and a charge of $77 is assessed to cover computer tape reproduction and shipping costs. For this, the user receives:

- o A magnetic tape which includes the INM Data Base, necessary computer programs, control statements for execution, sample input and output;
- o A magnetic tape containing 1970 census data for the United States;
- o This Installation Instructions manual;
- o A User's Guide containing detailed instructions for preparing input to the model.

## 2.0 GENERAL REFERENCES

The INM documentation includes a number of manuals for the model itself and several reports on activities which support the INM. A bibliography of these documents, each of which may be obtained from the FAA, is given below:


1. Bishop, D. E. and Beckmann, J.M., Bolt Beranek and Newman, Inc., "Civil Aircraft Noise Data for Computation of Aircraft Noise Contours," Report No. 4440, Project No. 09611, submitted to the U. S. Department of Transportation, November 1980 (Draft).

2. Potter, R. C. and Mills, J. F., Bolt Beranek and Newman Inc., "Aircraft Flight Profiles for Use in Aircraft Noise Prediction Models," Report No. 4594, Project No. 09612, submitted to the U. S. Department of Transportation, January 1981 (Draft).

3. Gados, R. G. and Aldred, J. M. "FAA Integrated Noise Model Validation, Phase I: Analysis of Integrated Noise Model Calculations for Air Carrier Flyovers," FAA-EE-80-04, December 1979.

4. Federal Aviation Administration, "INM, Integrated Noise Model, Version 3 - User's Guide," November 1981

5. Federal Aviation Administration, "INM, Integrated Noise Model, Version 3 - Programmer's Maintenance Manual," November 1981.

6. Federal Aviation Administration, "INM, Integrated Noise Model, Version 3 - Executive Summary," planned document for 1982.

7. Federal Aviation Administration, "INM, Integrated Noise Model, Version 3 - Data Base Manual," planned document for 1982.

8. Federal Aviation Administration, "INM, Integrated Noise Model, Version 3 - Methodology Manual," planned document for 1982.

## 3.0 INM COMPONENTS

The Integrated Noise Model consists of five major components:

a. The INM Data Base, which contains common flight profiles and noise characteristics for numerous aircraft types. The noise file for each aircraft consists of noise-vs-slant-range (distance between airplane and the listener) curves for several thrust settings.

b. The Census Tape, which contains 1970 population statistics for the United States. The tape is required only if IMPACT Reports are to be produced.

c. The user input file, which describes specific airport characteristics (altitude, temperature and wind conditions for the airport as well as number, length, and orientation of runways); types and numbers of aircraft operating during various times of day; arrival, departure and touch-and-go flight paths; and takeoff and landing profiles. The user also describes the type of analysis to be performed (grid or contour) and exercises available output options. In addition, user options allow changes to the data base, if necessary. Detailed instructions for preparation of the user input are contained in the User's Guide.

d. The preprocessors, which prepare input data for the model program. These include:

   (1) The Data Base Unformatting Routine, which transforms the INM data base from a formatted structure to the unformatted structure required by the model program.

(2) The Census Filter Routine, which extracts from the Census Tape that data needed for the area around the airport(s) to be studied. The user provides the coordinates of the window of the area to be studied.

e. The Model Program, which interacts with the INM Data Base, the local census data file and the user input to perform the required analyses and to produce the requested reports.

The general relationship among the INM components is illustrated in Figure 6.

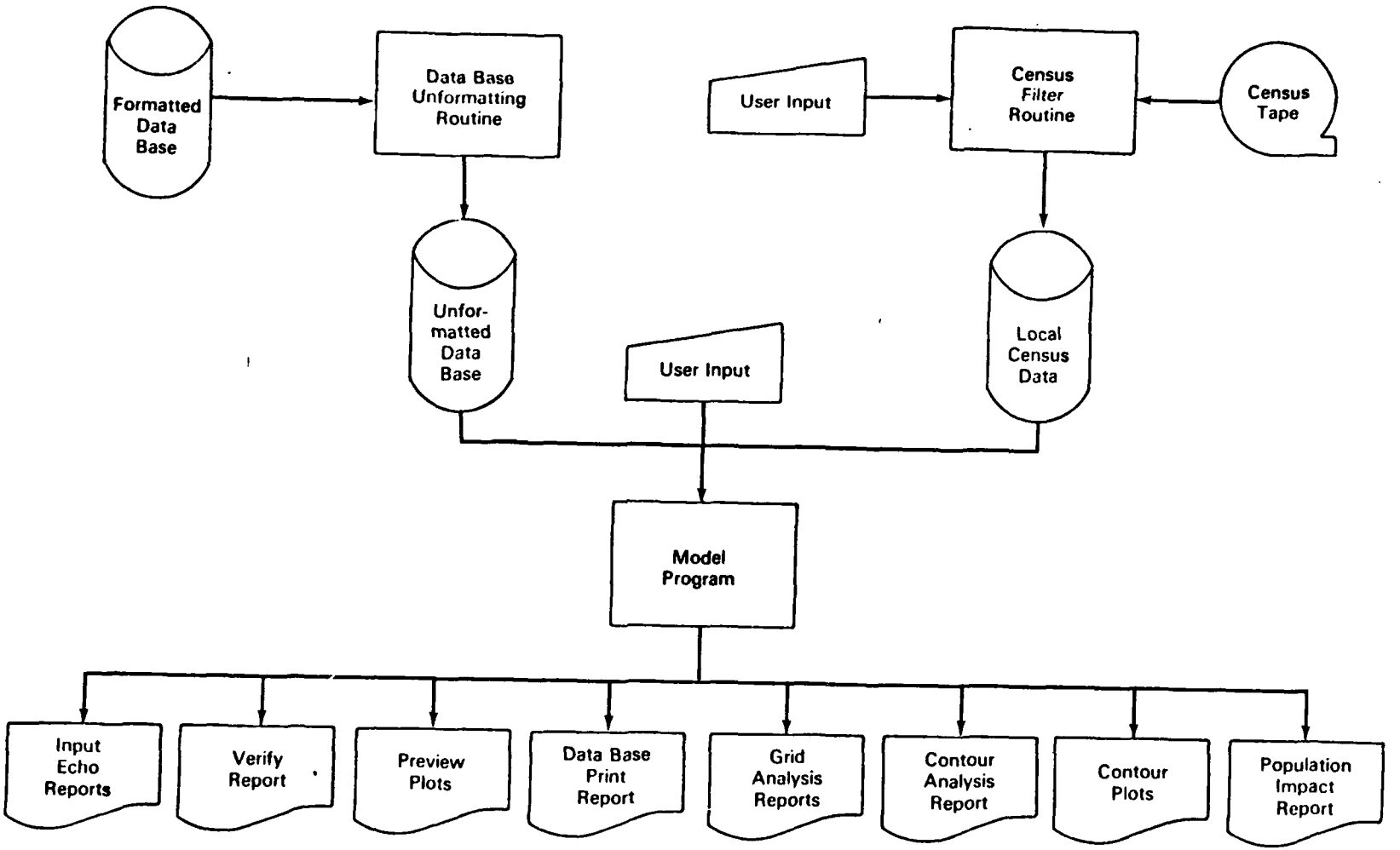


Figure 6
RELATIONSHIPS OF THE INM COMPONENTS

# 4.0 CDC VERSION

## 4.1 HARDWARE AND SOFTWARE REQUIREMENTS

The CDC version of the Integrated Noise Model operates on a 6000 series or Cyber 170 series central processing unit, with a minimum of 100,000 words of available memory and adequate direct access storage to maintain the files described in Section 4.2. A nine track tape drive is required to read in the INM release tape. A CalComp plotter is required to produce plots. If one is not available, modifications are required to some of the job streams. The modifications are described in Section 4.3.

The following software is required:

- o APEX operating system. If a system other than APEX is used, some modifications may have to be made to the control language.
- o FORTRAN Extended Version 4.0 compiler
- o CalComp plotter compatible subroutine library (if a plotter is to be used).

## 4.2 RELEASE TAPE AND CENSUS TAPE

The characteristics of the CDC release tape are as follows:

- o 9 track
- o 1600 bpi density
- o Unlabelled
- o Volume Serial Number as shown on reel
- o EBCDIC
- o Format as below:
  - Files 1 through 9 - fixed block, 80 characters per record, 64 records per block
  - File 10 - fixed block, 132 characters per record, 38 records per block.

The structure and content of the release tape are shown in Table 1.

TABLE I

CDC RELEASE TAPE DESCRIPTION

| File | Description | Number of Records* | Remarks |
|---|---|---|---|
| 1 | Control deck to read the remainder of the tape, compile and load the programs & load the data (CDCREL) | 46 | All control decks are constructed for execution in a remote batch mode. If interactive execution is planned, the user must make the necessary modifications. |
| 2 | Control deck to execute Model Program (CDCMEX) | 25 | |
| 31 | Control deck to execute Census Filter Routine (CDCCEX) | 17 | |
| 4 | Source Code for Model Program (EXEC) | 27,770 | EXEC requires 50K words to load 81K words to execute if overlaid |
| 5 | Source Code for Census Filter Routine (CENSUS) | 220 | CENSUS requires 18K words to load 13K words to execute |
| 6 | Source Code for Data Base Unformatting Routine (DBUNF) | 147 | DBUNF requires approx. 16K words to load, 11K words to execute |
| 7 | Formatted Data Base (INMDB) | 4,136 | INM Data Base |
| 8 | Sample Case for Model Input (INMINP) | 144 | Sample user input |
| 9 | Sample Census Input (INMCIP) | 1 | Sample user input for area around airport in sample case. |
| 10 | Sample Case Output | 2,651 | |

*Files 1 through 10 have 80 characters per record and File 10 has 132 characters per record.

The Census Tape consists of one file written in a format which is acceptable on all five of the computer systems on which the model is to operate. The characteristics of the tape are as follows:

- o 9 track
- o 1600 bpi density
- o Unlabelled
- o Volume Serial Number as shown on reel
- o EBCDIC
- o Format is fixed block lengths with 48 characters per record and 100 records per block.

## 4.3 INSTALLATION PROCEDURES

The table below presents the general steps involved in installing the model on any system.

SUMMARY OF INSTALLATION PROCEDURES

| STEPS | ACTIVITY |
|---|---|
| STEP 1. | Read the control statements stream contained in the first record on the release tape. |
| STEP 2. | Edit the control stream for your installation. |
| STEP 3. | Execute the control stream to compile and load the remainder of the release tape. |
| STEP 4. | Modify the control stream files for the Census Filter Routine and the Model Program for your installation. |
| STEP 5. | Test the Census Filter Routine by executing the sample census input. |
| STEP 6. | Test the Model Program by executing the sample case. |

The following paragraphs detail the steps for installing the model via remote entry batch processing on the CDC system. The control streams presented in this section were tested on the United Computing Services, Inc. CYBER 175 operating under APEX, a system similar to SCOPE. Changes may be required to the control streams to install the model under either the SCOPE or NOS operating systems. For example, UNBLOCK is an APEX command to copy and deblock a file.

STEP 1. Execute the following sequence of control statements in order to make the installation decks available:

```
TPREAD.  (Job name)
ACCOUNT,XXXXXXX.  (As required by installation)
REQUEST,T,VSN=NNNNN,F=S,LB=AU,CV=EB,D=PE,NT.  (Enter
                        VSN of release tape)
UNBLOCK (T,CDCREL,LL=80,N=1)
PUT,CDCREL.
COST.
DFD,DAY,R.
EXIT.
NOEXIT.
COST.
DFD,DAY,R.
```

The above statements will read in the first record from the release tape (see Figure 7). The first record contains the control statements required to process the remaining records, i.e., to copy the control streams, compile and load the Model Program and its preprocessors, copy the INM Data Base, create the unformatted data base and copy the input and output for the sample case (see Figure 8).

STEP 2. Edit the first record from the release tape (now on file CDCREL) and make the following modifications to it:

a. In line 110, enter account information as required by the installation (in place of XXXXXXX).

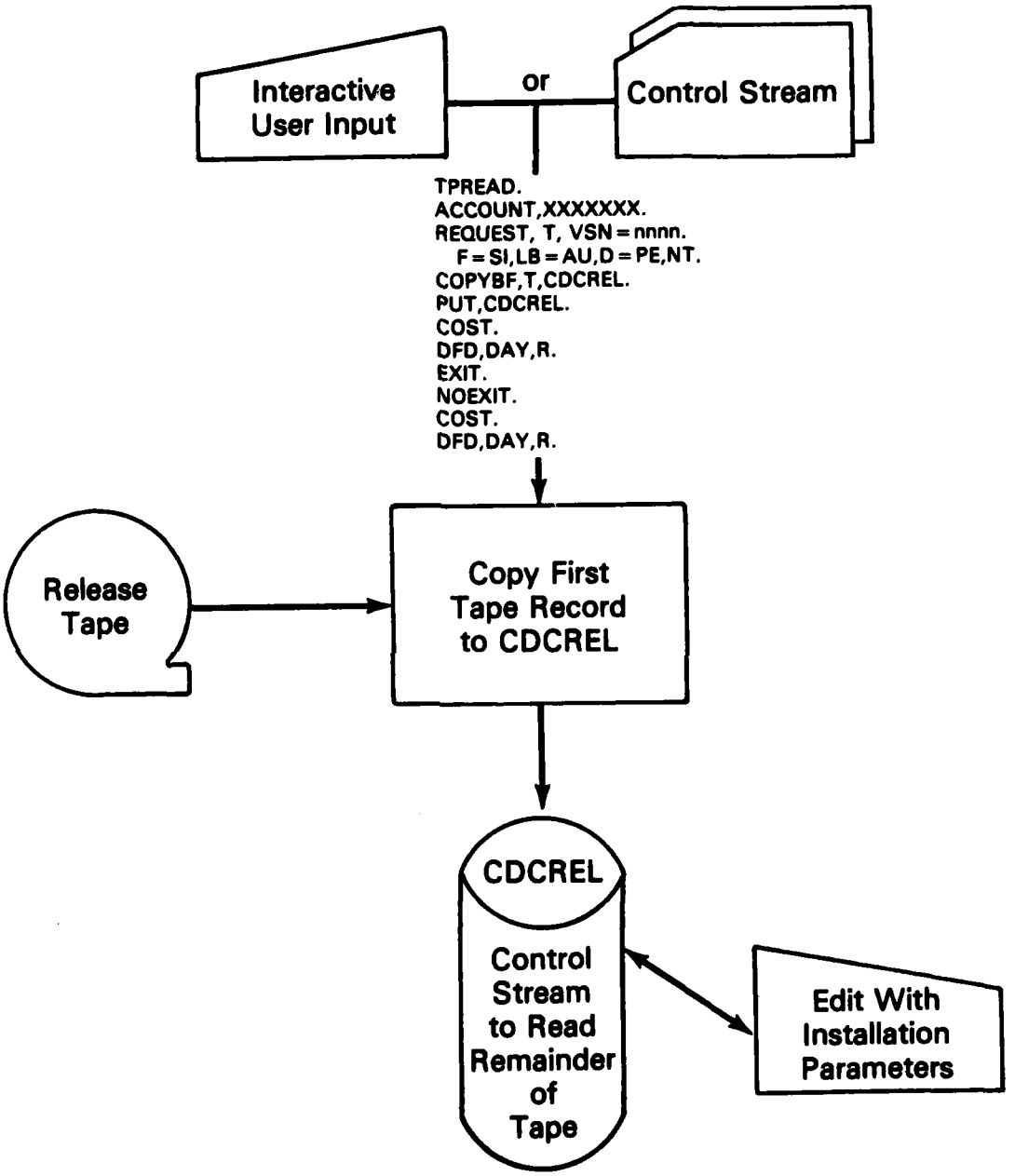


Figure 7

GENERAL FLOW DIAGRAM FOR CREATING CDC CONTROL STREAM
TO READ REMAINDER OF THE RELEASE TAPE

```
00100 CDCREL,CM177000,T500.
00110 ACCOUNT,XXXXXXX.
00120 REQUEST,T,VSN=NNNNN,F=S,LB=AU,CV=EB,D=PE,NT.
00130 UNBLOCK(T,TEMP,LL=80,N=1,NR)
00140 UNBLOCK(T,CDCMEX,LL=80,N=1,NR)
00150 PUT,CDCMEX.
00160 UNBLOCK(T,CDCCEX,LL=80,N=1,NR)
00170 PUT,CDCCEX.
00180 UNBLOCK(T,EXEC,LL=80,N=1,NR)
00190 REWIND,EXEC.
00200 FTN4O,I=EXEC,R=3,B=INMV3.
00210 PUT,INMV3. *SAVE MODEL PROGRAM
00220 RETURN,EXEC,INMV3.
00230 UNBLOCK(T,CENSUS,LL=80,N=1,NR)
00240 REWIND,CENSUS.
00250 FTN4O,I=CENSUS,R=3,B=INMCEN.
00260 PUT,INMCEN. *SAVE CENSUS FILTER ROUTINE
00270 RETURN,CENSUS,INMCEN.
00280 UNBLOCK(T,DBUNF,LL=80,N=1,NR)
00290 REWIND,DBUNF.
00300 FTN4O,I=DBUNF,R=3,B=INMUF.
00310 PUT,INMUF. *SAVE UNFORMATTING ROUTINE
00320 RETURN,DBUNF.
00330 UNBLOCK(T,TAPE2O,LL=80,N=1,NR)
00340 PUT,TAPE2O=INMDB. *SAVE DATA BASE
00350 REWIND,TAPE2O.
00360 REWIND,INMUF.
00370 LOAD(INMUF)
00380 EXECUTE. *CREATE UNFORMATTED DATA BASE
00390 PUT,TAPE21=INMUDB. *SAVE UNFORMATTED DATA BASE
00400 RETURN,INMUF,TAPE2O,TAPE21.
00410 UNBLOCK(T,INMINP,LL=80,N=1,NR)
00420 PUT,INMINP. *SAVE CASE INPUT DECK
00430 RETURN,INMINP.
00440 UNBLOCK(T,INMCIP,LL=80,N=1,NR)
```

Figure 8

CDC CONTROL STREAM CONTAINED ON THE
FIRST RECORD OF THE RELEASE TAPE

(Part 1 of 2)

```
00450 PUT,INMCIP. *SAVE CENSUS FILTER ROUTINE INPUT DECK
00460 RETURN,INMCIP.
00470 UNBLOCK(T,OUT99,LL=132,N=1,NR) *PRINT SAMPLE OUTPUT
00480 PUT,OUT99.
00490 COST.
00500 DFD,DAY,R.
00510 EXIT.
00520 NOEXIT.
00530 PUT,OUTPUT=OUT/D.
00540 COST.
00550 DFD,DAY,R.
```



Figure 8

CDC CONTROL STREAM CONTAINED ON THE
FIRST RECORD OF THE RELEASE TAPE

(Part 2 of 2)

b. In line 120, enter the Volume Serial Number of the release tape (in place of NNNNN).

c. If it is desirable to have copies of the source code for the Model Program and the preprocessors saved on disk, the following control statements should be added, in numerical order, to CDCREL:

```
00215  PUT, EXEC/D.    *SAVE MODEL PROGRAM
                        SOURCE

00265  PUT, CENSUS.    *SAVE CENSUS FILTER ROUTINE
                        SOURCE

00315  PUT, DBUNF.     *SAVE DATA BASE
                        UNFORMATTING ROUTINE
                        SOURCE
```

STEP 3. After making the above modifications, execute the job named CDCREL to compile and load the remainder of the release tape. A general flow diagram of the loading process resulting from execution of CDCREL is shown in Figure 9.

STEP 4. Modify the control statement streams for executing the Census Filter Routine and the Model Program which are contained on files CDCCEX and CDCMEX, respectively. Listings of each control statement stream are shown in Figures 10 and 11. In each stream in line 110 enter the account number for XXXXXXX.

In CDCCEX, in line 140, enter the Volume Serial Number for the Census Tape (in place of NNNNN). The Census Tape is supplied with the INM package.

In CDCMEX make the following additional changes:

a. If no plotter is available on the installation system, delete lines 160 and 200 and delete the phrase "LIB=XXXXXX," from line 170.

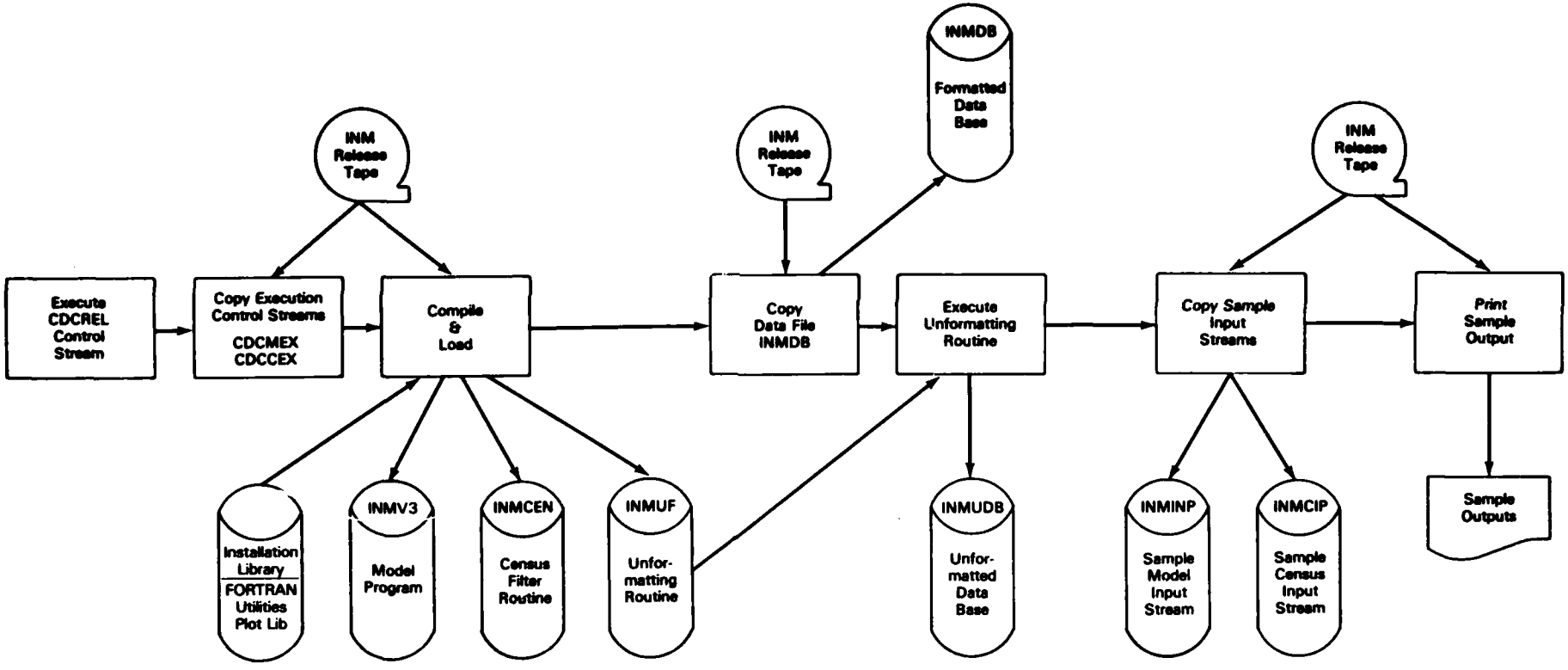


Figure 9

GENERAL FLOW DIAGRAM OF THE LOADING PROCESS OF FILE CDCREL

```
00100 CDCCEX,T500.
00110 ACCOUNT,XXXXXXX.
00120 GET,TAPE5=INMCIP. *INMCIP IS SAMPLE INPUT DECK
00130 FILE(TAPE20,BT=K,RT=F,FL=48,RB=100,MBL=4800,CM=YES)
00140 REQUEST,TAPE20,VSN=NNNNN,F=S,LB=AU,CV=EB,D=PE,NT. * US CENSUS TAPE
00150 GET,INMCEN. *INMCEN IS CENSUS FILTER ROUTINE
00160 LDSET(FILES=TAPE20)
00170 LOAD(INMCEN)
00180 EXECUTE.
00190 PUT,TAPE21=INMLOC. *INMLOC IS RESULTING LOCAL CENSUS DATA
00200 RETURN,INMCIP,TAPE20,INMCEN.
00210 PUT,OUTPUT=CENOUT.
00220 DFD,DAY,R.
00230 EXIT.
00240 NOEXIT.
00250 PUT,OUTPUT=CENOUT.
00260 DFD,DAY,R.
```



Figure 10

CDCCEX (CENSUS FILTER EXECUTION)

```
00100 CDCMEX,T1500.
00110 ACCOUNT,XXXXXX.
00120 GET,TAPE2=INMINP. *INMINP IS SAMPLE USER INPUT
00130 GET,TAPE3=INMUDB. *INMUDB IS UNFORMATTED DATA BASE
00140 GET,TAPE9=INMLOC. *INMLOC IS SAMPLE LOCAL CENSUS DATA
00150 GET,INMV3. *INMV3 IS MODEL PROGRAM
00160 GET,XXXXXX/LIBRARY. *GET CALCOMP LIBRARY
00170 LDSET(LIB=XXXXXX,USEP=$W.SQ$)
00180 LOAD(INMV3)
00190 EXECUTE.
00200 RETURN,XXXXXX.
00210 RETURN,TAPE2,TAPE3,INMV3.
00220 RETURN,TAPE9.
00230 PUT,TAPE22=MSGRD. *MSGRD IS SAVED GRID FILE
00240 PUT,TAPE8=PLTFIL.  *PLTFIL IS THE PLOT FILE
00250 COST.
00260 PUT,OUTPUT=EXOUT.
00270 DFD,DAY,R.
00280 EXIT.
00290 NOEXIT.
00300 COST.
00310 PUT, TAPE22=MSGRD.
00320 PUT,TAPE8=PLTFIL.
00330 PUT,OUTPUT=EXOUT.
00340 DFD,DAY,R.
```



Figure 11

CDCMEX (MODEL PROGRAM EXECUTION)

b. If a CalComp plotter is available on the system, enter the installation identification for the library plot package in lines 160, 170 and 200 (in place of XXXXXX). For example, at United Computing Systems, "CALC40 " is used.

STEP 5. Execute a sample Census Filter run by executing CDCCEX with parameters as included in the control statement stream. This will result in the use of the sample input file called INMCIP. The output file (INMLOC) created by this run should be used as input to the Model Program. The output expected from this run is shown below.

```
THE FOLLOWING STATES ARE INCLUDED IN THE CENSUS WINDOW
            NEW YORK
            NEW JERSEY
            PENNSYLVANIA
            DELAWARE
            MARYLAND
3422043     PEOPLE WITHIN THE CENSUS WINDOW
1139448     RESIDENCES WITHIN THE CENSUS WINDOW

135753      RECORDS WERE READ FROM THE CENSUS TAPE
  3594      RECORDS WERE EXTRACTED
```

A general flow diagram of execution of CDCCEX is shown in Figure 12.

STEP 6. Execute a sample Model Program run as follows:

a. If no plotter is available, modify the sample user input file INMINP so that it contains no requests for plots within the PROCESS section. In other words, delete the following line:

```
PLOT  SIZE  11  8.5  SCALE = 12000
```

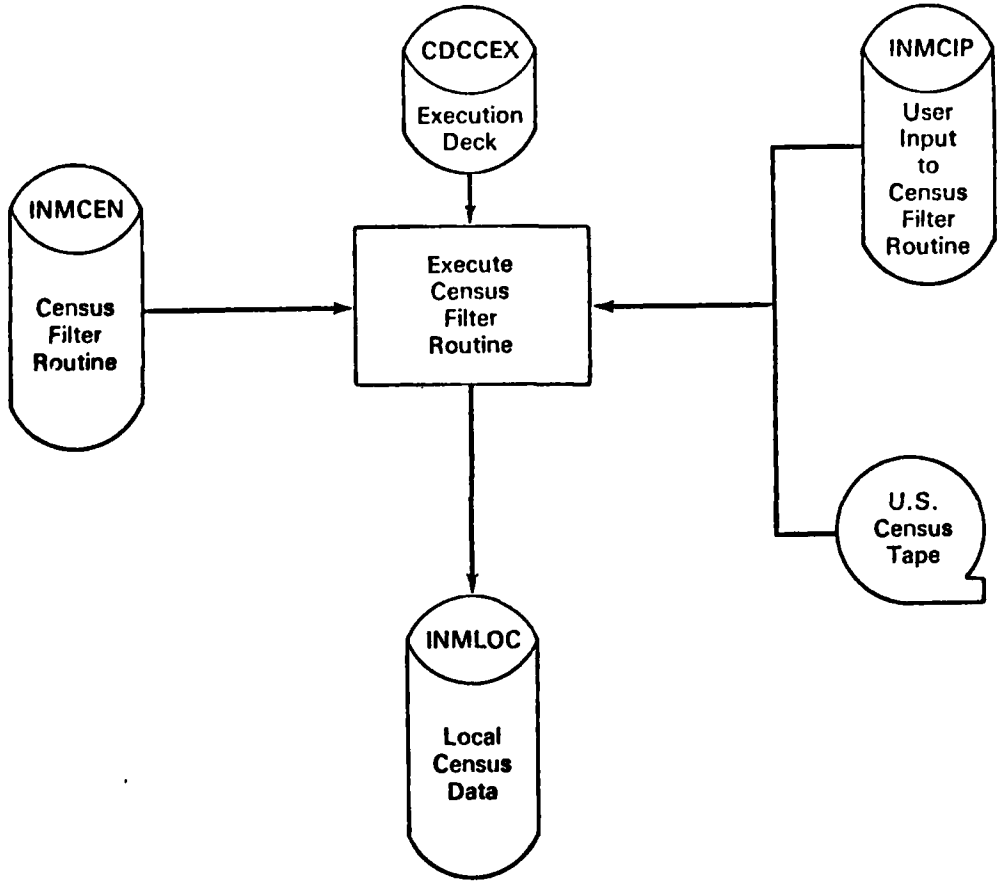


Figure 12

GENERAL FLOW DIAGRAM CDC CENSUS FILTER EXECUTION

b. Execute CDCMEX with parameters as included in the control statement stream. This will result in the use of the sample input file INMINP and the local Census File INMLOC which was produced in STEP 5. The output from this run should be identical to the sample output on file #10 of the release tape.

A general flow diagram of execution of CDCMEX is shown in Figure 13.

## 4.4 EXECUTION PROCEDURES

After the installation process has been completed successfully, the user must accomplish the following steps in order to execute the Integrated Noise Model using other than the sample input data provided on the release tape:

a. Determine the geographic coordinates of the window to be used to extract data from the Census Tape. The window coordinates are defined below:

window lower left longitude
window lower left latitude
window upper right longitude
window upper right latitude.

Each point must be given in degrees, minutes and seconds, with East longitudes and North latitudes being positive degrees and West longitudes and South latitudes being negative degrees. These values must be placed on the census input file in 4(F5.0, F3.0, F4.1) format. Identify the name of the census input file.

It is suggested that a window covering 15 miles in each direction from the airport center be used to obtain a reasonable area of impact. The value of 15 miles is roughly .25 degrees or 15 minutes of latitude or longitude within the U. S.

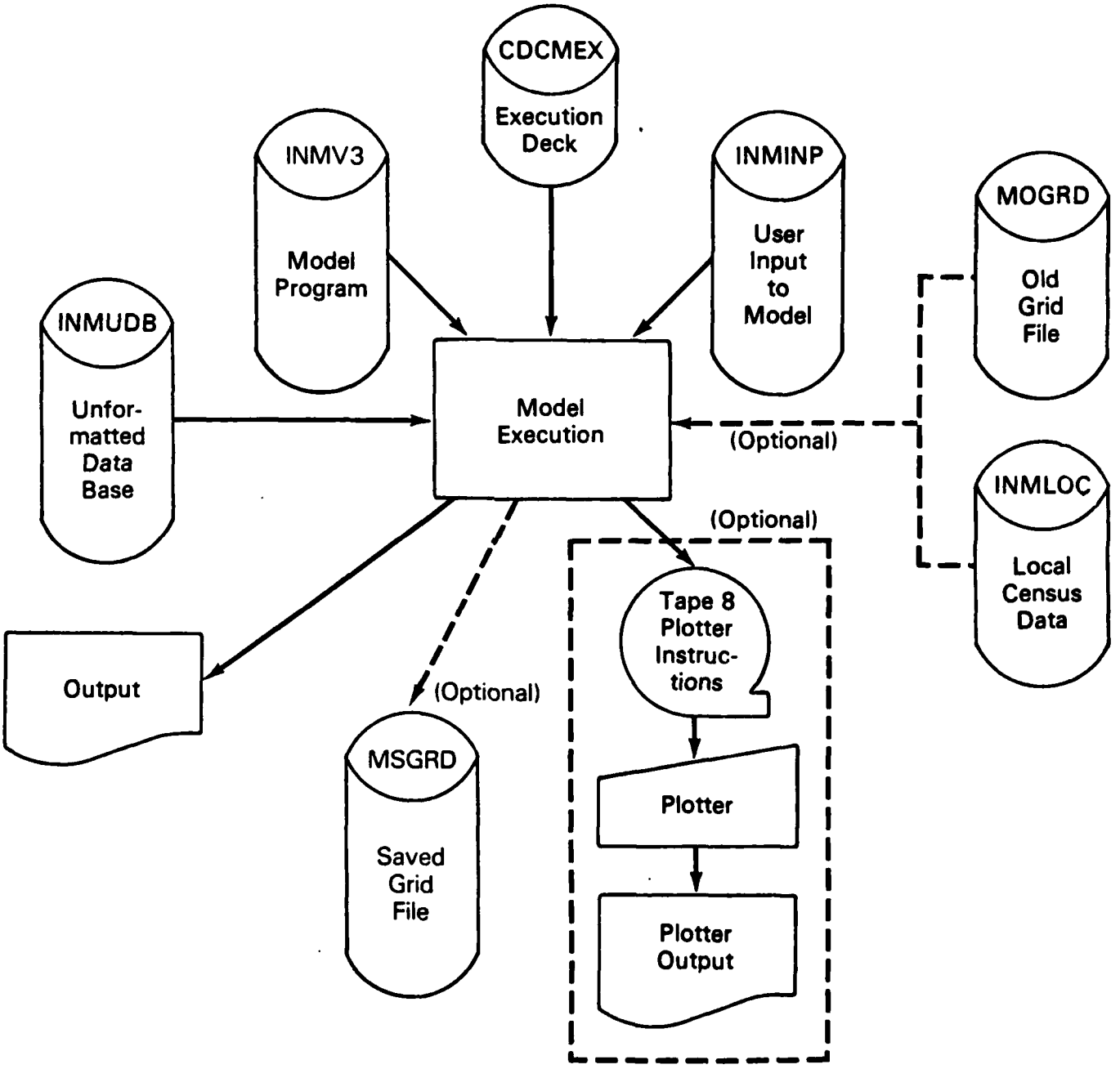


Figure 13

GENERAL FLOW DIAGRAM
CDC MODEL PROGRAM EXECUTION

b. In line 120 of the control statement stream CDCCEX change "INMCIP" to the appropriate file name for the census input file and in line 190 "INMLOC" to the file on which the local Census Data is to reside. Then execute the Census Filter Routine by submitting the revised CDCCEX file. If an appropriate window has been selected, this routine will not need to be executed again for the given airport. However, if a study is done for another airport, a local census file for that airport must be created.

c. Using the instructions given in the User's Guide, generate the required input data for the model. Identify the name of the input file to be used.

d. Determine the input and output files required for the user input file just created. Table 2 describes all of the possible files and indicates when they are required.

e. Change the control statement stream CDCMEX to reference the appropriate files.

1 - In line 120 change "INMINP" to the appropriate file in which the user input data reside.

2 - If TAPE9 is required, in line 140 change "INMLOC" to the appropriate name for the local census data. If TAPE9 is not required, delete lines 140 and 220.

3 - If TAPE21 is required, add after line 140 the line "00145 GET, TAPE21=MOGRD." where "MOGRD " is replaced by the appropriate file name for the old grid file. Also add after line 220 "00225 RETURN, TAPE21."

4 - If TAPE22 is required, in lines 230 and 310 change "MSGRD" to the appropriate file name for the grid file to be saved. If TAPE22 is not required, delete lines 230 and 310.

5 - If TAPE8 is required, in lines 240 and 320 substitute the appropriate file name for "PLTFIL". If TAPE8 is not required, delete lines 240 and 320.

f. Execute the Model Program by submitting the corrected CDCMEX file.

TABLE 2

CDC INPUT AND OUTPUT FILES FOR THE MODEL PROGRAM

| FILE | TYPE | DESCRIPTION | COMMENTS |
|---|---|---|---|
| TAPE2 | Input | User Input Data | Always required; created by user. |
| TAPE3 | Input | Unformatted Data Base | Always required; created during installation. |
| TAPE9 | Input | Local Census Data | Required only if IMPACT Reports are requested; created by executing Census Filter Routine. |
| TAPE21 | Input | Old Grid File | Required only if retrieving contour data from an old file; created by saving contours during a previous run. |
| TAPE22 | Output | Saved Grid File | Required only if saving contours. |
| TAPE8 | Output | Plotter Tape for PREVIEW and PLOT | Required only if requesting either PREVIEW or PLOT. The model uses the same tape for both types of plots but the model can be changed by the maintenance programmer to produce separate plotter tapes. Some systems such as the one at UCS allows TAPE8 to be a disk file rather than a tape. |

## 4.5 CDC REFERENCE MANUALS

The following Control Data Corporation (CDC) manuals may be useful in installing the INM model on the CDC computer:

KRONOS 2.1 Reference Manual
Order Number 60407000

NOS Version 1 Reference Manual
Volume 1 of 2 Order Number 60435400
Volume 2 of 2 Order Number 60445300

FORTRAN Extended Version 4
Order Number 60397800

In addition, the following United Computing Systems, Inc. (2525 Washington, Kansas City, Missouri 64108) manuals may be useful in installing the model on the CDC computer:

APEX/SL BATCH Reference Manual
Order Number 6S32-879

APEX/SL FORTRAN Reference Manual
Order Number 6L2-1078

# 5.0 IBM VERSION

## 5.1 HARDWARE AND SOFTWARE REQUIREMENTS

The IBM version of the Integrated Noise Model operates on a S/360-370 series central processing unit, with a minimum of 832K bytes of available memory and adequate direct access storage to maintain the files described in Section 5.2. A nine track tape drive is required to read in the INM release tape. A CalComp platter is required to produce plots. If one is not available, modifications are required to some of the Job Control Language (JCL). The modifications are described in Section 5.3.

The following software is required:

- o OS/VS2 (Operating System/Virtual Storage, Version 2) operating system. If other than OS/VS2, some modifications may have to be made to the JCL.
- o FORTRAN G compiler
- o CalComp plotter compatible subroutine library (if plotter is to be used).

## 5.2 RELEASE TAPE AND CENSUS TAPE

The characteristics of the IBM release tape are as follows:

- o 9 track
- o 1600 bpi density
- o Unlabelled
- o Volume Serial Number as shown on reel
- o EBCDIC
- o Format as below:

  Files 1 through 9 - FB, LRECL = 80, BLKSIZE = 10000

  File 10 - FB, LRECL = 132, BLKSIZE = 9900

The structure and content of the release tape are shown in Table 3.

The Census Tape consists of one file written in a format which is acceptable on all five of the computer systems on which the model is to operate. The characteristics of the tape are as follows:

- o 9 track
- o 1600 bpi density
- o Unlabelled
- o Volume Serial Number as shown on reel
- o EBCDIC
- o Format is fixed block lengths with 48 characters per record and 100 records per block.

Table 4 describes the files created during installation of the model from the release tape using the procedure described in Section 5.3.

## 5.3 INSTALLATION PROCEDURES

The table below presents the general steps involved in installing the model on any system.

SUMMARY OF INSTALLATION PROCEDURES

| STEPS | ACTIVITY |
|---|---|
| STEP 1. | Read the job control language (JCL) contained in the first record on the release tape. |
| STEP 2. | Edit the JCL for your installation. |
| STEP 3. | Execute the JCL to compile and load the remainder of the release tape. |

TABLE 3

IBM RELEASE TAPE DESCRIPTION

| File | Description | Number of Records* | Remarks |
|---|---|---|---|
| 1 | Control deck to read the remainder of the tape, compile and load the programs & load the data (IBMREL) | 123 | All control decks are constructed for execution in a remote batch mode. If interactive execution is planned, the user must make the necessary modifications. |
| 21 | Control deck to execute Model Program (IBMMEX) | 57 | |
| 3 | Control deck to execute Census Filter Routine (IBMCEX) | 13 | |
| 4 | Source Code for Model Program (EXEC) | 27,708 | EXEC requires 684K words to execute |
| 5 | Source Code for Census Filter Routine (CENSUS) | 220 | CENSUS requires 80K words to execute |
| 6 | Source Code for Data Base Unformatting Routine (DBUNF) | 147 | DBUNF requires 52K words to execute |
| 7 | Formatted Data Base (INMDB) | 4,136 | INM Data Base |
| 8 | Sample Case for Model Input (INMINP) | 144 | Sample user input |
| 9 | Sample Census Input (INMCIP) | 1 | Sample user input for area around airport in sample case. |
| 10 | Sample Case Output | 2,648 | |

*Files 1 through 9 have 80 characters per record and File 10 has 132 characters per record.

TABLE 4. DESCRIPTION OF THE IBM FILES

| FILE NAME | DESCRIPTION | MEMBERS | RECORD FORMAT | RECORD LENGTH | BLOCK SIZE | NUMBER OF BLOCKS ALLOCATED |
|---|---|---|---|---|---|---|
| INMCNT | Partitioned data set of JCL files | IBMREL, IBMCEX, IBMMEX | FB | 80 | 6160 | 50 |
| INMLIB | Partitioned data set of load modules for the Census Filter Routine, Data Base Unformatting Routine and the Model Program. | INMCEN, INMUF, INMV3 | U | 6144 | 6144 | 1500 |
| INMDAT | Partitioned data set of data files | INMDB, INMINP, INMCIP | FB | 80 | 6160 | 50 |
| INMUDB | Sequential file of unformatted data base | N/A | VBS | 536 | 540 | 130 |
| INMLOC | Sequential file of local census data | N/A | VBS | 44 | 6164 | 12 |
| MSGRD | Sequential file of data output from a Contour Analysis. Saved for a later retrieval. | N/A | VBS | 84 | 88 | 7000 |
| INMSC3 (Optional) | Partitioned data set of source codes for the Census Filter Routine, Data Base Unformatting Routine and the Model Program | CENSUS, DBUNF, EXEC | FB | 80 | 6160 | 500 |

STEP 4. Modify the JCL files for the Census Filter Routine and the Model Program for your installation.

STEP 5. Test the Census Filter Routine by executing the sample census input.

STEP 6. Test the Model Program by executing the sample run.

The following paragraphs detail the steps for installing the model via remote entry batch processing on the IBM system. The JCL presented in this section was tested on the Boeing Computer Services Company (BCS) IBM 370 Model 168 computer operating under OS/VS2 (Operating System/Virtual Storage, Version 2). Changes may be required to the JCL to install the model under other operating systems.

At BCS, the naming convention for direct access data sets is ACCOUNT.NAME.TYPE, where ACCOUNT is the user account number, NAME is a user-selected file name and TYPE is a qualifier such as DATA, FORT, CNTL, LIB. A tape file requires only a name of the form ACCOUNT.NAME. For example, in the JCL presented in this section FAA130.INMUDB.DATA is a sequential data set, FAA130.INMCNT.CNTL (IBMCEX) is a member of a partitioned data set, and FAA130.IBMV3 is a tape file. When installing the model on another system, modify the file names to meet the requirements at that installation. Note that in the examples all user file names begin with FAA130 making it easy to modify the file names via an editor.

In the sample JCL, the release tape has been named FAA130.IBMV3 for all files on the tape and is identified as volume serial number W28140. Obtain the name and serial number of the release tape at your installation and modify the JCL appropriately.

STEP 1. Modify the file names, tape number and tape name in the following JCL and execute it in order to make the installation decks available:

```
00010 //* TPREAD
00020 // EXEC PGM=IEBGENER
00030 //SYSPRINT DD SYSOUT=A
00040 // SYSIN DD *
00050   GENERATE MAXNAME=1
00060   MEMBER NAME=IBMREL
00070 // SYSUT1 DD UNIT=2400-4,DISP=(OLD,KEEP),DSN=FAA130.
        IBMV3,
00080 // VOL=SER=W28140,LABEL=(1,NL),
00090 // DCB=(LRECL=80,BLKSIZE=10000,BUFNO=2,RECFM=FB,
      DEN=3)
00100 // SYSUT2 DD DSN=FAA130.INMCNT.CNTL,UNIT=SYSTS,
      DISP=(MOD,CATLG),
00110 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),
      SPACE=(6160,(50,15,6))
```

The above statements will read in the first record from the release tape (see Figure 14). The first record contains the JCL to process the remaining records, i.e., to copy the execution JCL files, compile and load the Model Program and its preprocessors, copy the INM Data Base, create the unformatted data base, and copy the input and output for the sample case. Figure 15 contains a listing of the JCL on the first record.

STEP 2. Edit the first record from the release tape (now on file IBMREL within the partitioned data set INMCNT) and make the following modifications to it:

- Throughout the file, modify the file names, tape number, and tape name for your installation. Note that SYS1.BCSLIB and SYS1.LCLLIB are BCS libraries needed for linkage of the FORTRAN programs and you must substitute your installation libraries.

- If no plotter is available on the installation system, delete line 490.

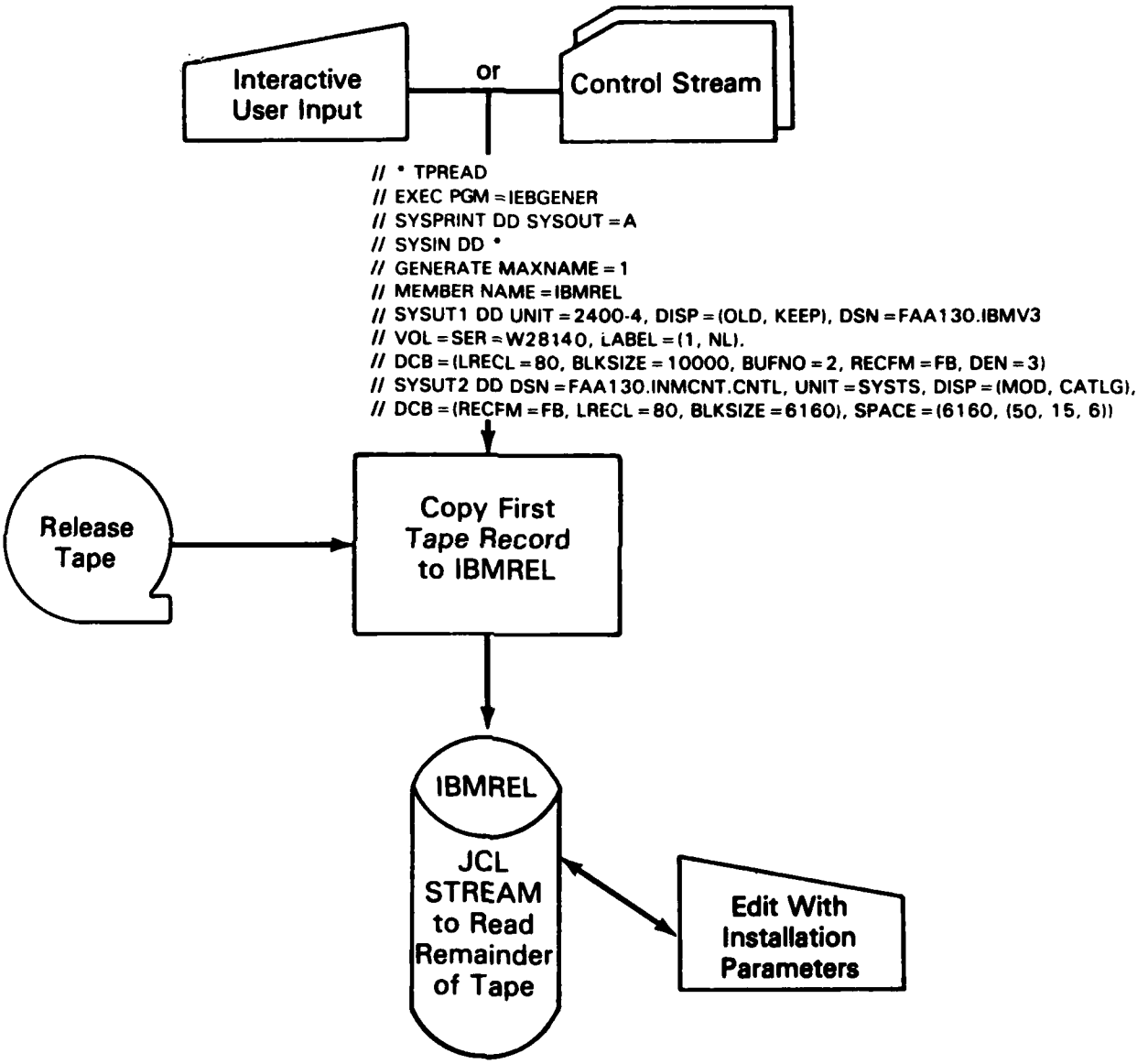


Figure 14

GENERAL FLOW DIAGRAM FOR CREATING IBM JCL
TO READ REMAINDER OF THE RELEASE TAPE

```
00010 //FAA130   JOB ED,NAME,TIME=2   *INSTALLATION DEPENDENT
00020 /*JOBPARM LINES=50
00030 //*
00040 //* JCL TO READ RELEASE TAPE
00050 //*
00060 //* PROCEDURE TO READ FILES FROM TAPE
00070 //READ PROC N=2,NAME=,V1=50,V2=15
00080 //RD EXEC PGM=IEBGENER,REGION=64K
00090 //SYSPRINT DD SYSOUT=A
00100 //SYSUT1 DD DSN=FAA130.IBMV3,UNIT=2400-4,DISP=(OLD,PASS),
00110 // VOL=SER=W28140,LABEL=(&N,NL),
00120 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=10000,BUFNO=2,DEN=3)
00130 //SYSUT2 DD DSN=&NAME,UNIT=SYSTS,DISP=(MOD,CATLG),
00140 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(&V1,&V2,3))
00150 // PEND
00160 //*
00170 //*PROCEDURE TO PRINT FILES FROM TAPE
00180 //PRINT PROC N=10
00190 // EXEC PGM=IEBGENER,REGION=64K
00200 //SYSPRINT DD SYSOUT=A
00210 //SYSIN DD DUMMY
00220 //SYSUT1 DD DSN=FAA130.IBMV3,UNIT=2400-4,DISP=(OLD,PASS),
00230 // VOL=SER=W28140,LABEL=(&N,NL),
00240 // DCB=(RECFM=FB,LRECL=132,BLKSIZE=9900,BUFNO=2,DEN=3)
00250 //SYSUT2 DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=132,BLKSIZE=132)
00260 // PEND
00270 //*
00280 //* COPY JCL FILES TO EXECUTE MODEL PROGRAM AND
00290 //* CENSUS FILTER ROUTINE
00300 //STEP1 EXEC READ,N=2,NAME='FAA130.INMCNT.CNTL'
00310 //SYSIN DD *
00320  GENERATE MAXNAME=1
00330  MEMBER NAME=IBMMEX
00340 //STEP2 EXEC READ,N=3,NAME='FAA130.INMCNT.CNTL',COND=EVEN
00350 //SYSIN DD *
```

Figure 15

IBM JCL CONTAINED ON THE FIRST RECORD OF THE RELEASE TAPE

(Part 1 of 4)

```
00360  GENERATE MAXNAME=1
00370  MEMBER NAME=IBMCEX
00380 //*
00390 //* COMPILE AND LKED MODEL PROGRAM
00400 //STEP3 EXEC FORTGCL,REGION=256K,PARM.FORT='NOSOURCE,NOMAP',
00401 // COND.FORT=EVEN,PARM.LKED='NOLIST,NOMAP',
00410 // COND.LKED=(EVEN,(7,LT,STEP3.FORT))
00420 //FORT.SYSLIN DD SPACE=(CYL,(10,1))
00430 //FORT.SYSIN DD DSN=FAA130.IBMV3,UNIT=2400-4,DISP=(OLD,PASS),
00440 // VOL=SER=W28140,LABEL=(4,NL),
00450 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=10000,BUFNO=2,DEN=3)
00460 //LKED.SYSLIB DD DSN=SYS1.FORTLIB,DISP=SHR
00470 // DD DSN=SYS1.BCSLIB,DISP=SHR
00480 // DD DSN=SYS1.LCLLIB,DISP=SHR
00490 // DD DSN=SYSA.GRPH.LOAD,DISP=SHR
00500 //LKED.SYSLMOD DD DSN=FAA130.INMLIB.LIB(INMV3),UNIT=SYSTS,
00510 // DISP=(MOD,CATLG),SPACE=(6144,(1500,50,3)),
00520 // DCB=(RECFM=U,LRECL=6144,BLKSIZE=6144)
00530 //*
00540 //* COMPILE & LKED CENSUS FILTER ROUTINE
00550 //STEP4 EXEC FORTGCL,REGION=256K,PARM.FORT='NOSOURCE,NOMAP',
00551 // COND.FORT=EVEN,PARM.LKED='NOLIST,NOMAP',
00560 // COND.LKED=(EVEN,(7,LT,STEP4.FORT))
00570 //FORT.SYSIN DD DSN=FAA130.IBMV3,UNIT=2400-4,DISP=(OLD,PASS),
00580 // VOL=SER=W28140,LABEL=(5,NL),
00590 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=10000,BUFNO=2,DEN=3)
00600 //LKED.SYSLMOD DD DSN=FAA130.INMLIB.LIB(INMCEN),UNIT=SYSTS,
00610 // DISP=(MOD,CATLG),SPACE=(6144,(1500,50,3)),
00620 // DCB=(RECFM=U,LRECL=6144,BLKSIZE=6144)
00630 //*
00640 //* COMPILE & LKED UNFORMATTING ROUTINE
00650 //STEP5 EXEC FORTGCL,REGION=256K,PARM.FORT='NOSOURCE,NOMAP',
00651 // COND.FORT=EVEN,PARM.LKED='NOLIST,NOMAP',
00660 // COND.LKED=(EVEN,(7,LT,STEP5.FORT))
00670 //FORT.SYSIN DD DSN=FAA130.IBMV3,UNIT=2400-4,DISP=(OLD,PASS),
```

Figure 15

IBM JCL CONTAINED ON THE FIRST RECORD OF THE RELEASE TAPE

(Part 2 of 4)

```
00680 // VOL=SER=U28140,LABEL=(6,NL),
00690 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=10000,BUFNO=2,DEN=3)
00700 //LKED.SYSLMOD DD DSN=FAA130.INMLIB.LIB(INMUF),UNIT=SYSTS,
00710 // DISP=(MOD,CATLG),SPACE=(6144,(1500,50,3)),
00720 // DCB=(RECFM=U,LRECL=6144,BLKSIZE=6144)
00730 //*
00740 //* LOAD UNFORMATTED DATA BASE
00750 //STEP6 EXEC READ,N=7,NAME='FAA130.INMDAT.DATA',COND=EVEN
00760 //SYSIN DD *
00770  GENERATE MAXNAME=1
00780  MEMBER NAME=INMDB
00790 //*
00800 //* EXECUTE UNFORMATTING ROUTINE
00810 //STEP7 EXEC PGM=INMUF,REGION=64K,
00820 // COND=(EVEN,(7,LT,STEP5.LKED),(0,LT,STEP6.RD))
00830 //STEPLIB DD DSN=FAA130.INMLIB.LIB,DISP=SHR
00840 //FT20F001 DD DSN=FAA130.INMDAT.DATA(INMDB),DISP=SHR
00850 //FT21F001 DD DSN=FAA130.INMUDB.DATA,DISP=(NEW,CATLG),
00860 // UNIT=SYSTS,SPACE=(540,(130,20),RLSE),
00870 // DCB=(DSORG=PS,RECFM=VBS,LRECL=536,BLKSIZE=540)
00880 //FT06F001 DD SYSOUT=A
00890 //*
00900 //* LOAD SAMPLE INPUTS
00910 //STEP8 EXEC READ,N=8,NAME='FAA130.INMDAT.DATA',COND=EVEN
00920 //SYSIN DD *
00930  GENERATE MAXNAME=1
00940  MEMBER NAME=INMINP
00950 //STEP9 EXEC READ,N=9,NAME='FAA130.INMDAT.DATA',COND=EVEN
00960 //SYSIN DD *
00970  GENERATE MAXNAME=1
00980  MEMBER NAME=INMCIP
00990 //*
01000 //* PRINT SAMPLE OUTPUT
01010 //STEP10 EXEC PRINT,N=10,COND=EVEN
01020 //*
```

Figure 15

IBM JCL CONTAINED ON THE FIRST RECORD OF THE RELEASE TAPE

(Part 3 of 4)

```
01030 //* SAVE SOURCE CODE FOR MODEL PROGRAM AND PREPROCESSORS
01040 //* OPTIONAL. TO INVOKE CHANGE COND TO EVEN IN EACH STEP.
01050 //STEP11 EXEC READ,N=4,NAME='FAA130.INMSC3.FORT',V1=250,V2=50,
01060 // COND=(0,LE)
01070 //SYSIN DD *
01080  GENERATE MAXNAME=1
01090  MEMBER NAME=EXEC
01100 //STEP12 EXEC READ,N=5,NAME='FAA130.INMSC3.FORT',V1=250,V2=50,
01110 // COND=(0,LE)
01120 //SYSIN DD *
01130  GENERATE MAXNAME=1
01140  MEMBER NAME=CENSUS
01150 //STEP13 EXEC READ,N=6,NAME='FAA130.INMSC3.FORT',V1=250,V2=50,
01160 // COND=(0,LE)
01170 //SYSIN DD *
01180  GENERATE MAXNAME=1
01190  MEMBER NAME=DBUNF
01200 //*
```



Figure 15

IBM JCL CONTAINED ON THE FIRST RECORD OF THE RELEASE TAPE

(Part 4 of 4)

- o If a CalComp plotter is available, in line 490 change SYSA.GRPH.LOAD to the library name for the CalComp plotter software at your installation.

- o If it is desirable to have copies of the source code for the Model Program and the preprocessors saved on disk, change the condition codes in STEP11, STEP12 and STEP13 to EVEN.

- o If it is desirable to get a listing of the source codes, in STEP3, STEP4 and STEP5 change "NOSOURCE,NOMAP" to "SOURCE,MAP" and "NOLIST,NOMAP" to "LIST,MAP".

STEP 3. After making the above modifications, execute the job named IBMREL to process the remainder of the release tape. A general flow diagram of the loading process resulting from execution of IBMREL is shown in Figure 16.

The JCL in IBMREL has been set up so that each step will execute as long as all of the preceding steps on which the given step is dependent are executed successfully. Therefore, if IBMREL does not execute successfully the first time, before executing IBMREL again you can delete from IBMREL those steps which have executed successfully.

STEP 4. Modify the JCL for executing the Census Filter Routine and the Model Program which are contained on files IBMCEX and IBMMEX, respectively. Listings of the JCL files, which are members of partitioned data set INMCNT, are shown in Figures 17 and 18. Make the usual file name and tape number changes. In addition, in IBMCEX change W33040 to the serial number of the Census Tape and in IBMMEX change W33034 to the serial number of the plot tape. The Census Tape is supplied with the INM package.

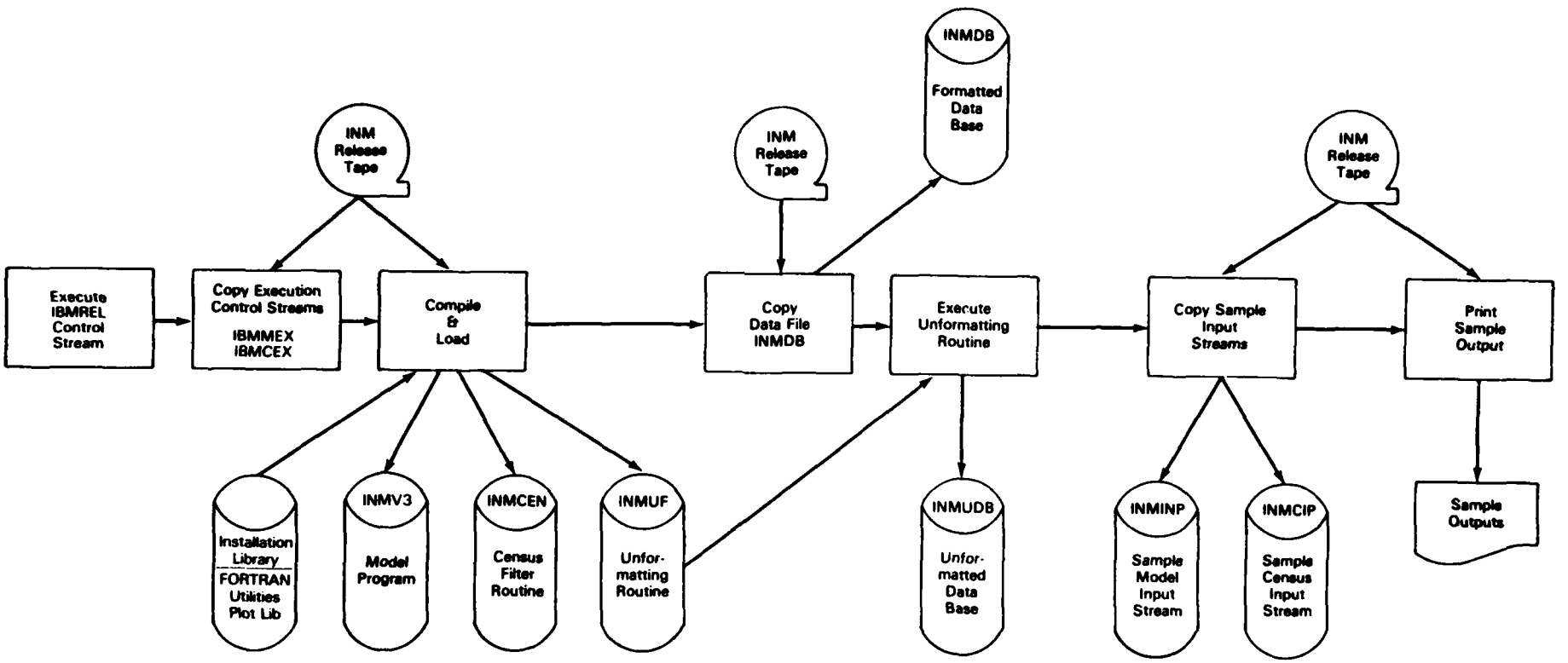


Figure 16

GENERAL FLOW DIAGRAM OF THE
LOADING PROCESS OF FILE IBMREL

```
00010 //FAA130  JOB ED,NAME   *INSTALLATION DEPENDENT
00020 //* EXECUTE CENSUS FILTER ROUTINE
00030 //STEP1 EXEC PGM=INMCEN,REGION=64K
00040 //STEPLIB DD DSN=FAA130.INMLIB.LIB,DISP=SHR
00050 //FT05F001 DD DSN=FAA130.INMDAT.DATA(INMCIP),DISP=SHR
00060 //FT20F001 DD DSN=FAA130.CENTPE,UNIT=2400-4,DISP=(OLD,KEEP),
00070 // VOL=SER=W33040,LABEL=(1,NL),DCB=(RECFM=FB,LRECL=48,
00080 // BLKSIZE=9600,BUFNO=2,DEN=3)
00090 //FT21F001 DD DSN=FAA130.INMLOC.DATA,DISP=(NEW,CATLG),
00100 // UNIT=SYSTS,SPACE=(6164,(12,2),RLSE),
00110 // DCB=(DSORG=PS,RECFM=VBS,LRECL=44,BLKSIZE=6164)
00120 //FT06F001 DD SYSOUT=A
00130 //*
```



Figure 17

IBMCEX (CENSUS FILTER EXECUTION)

```
00010 //FAA130 JOB ED,NAME,TIME=15,REGION=832K
00020 //STEP1 EXEC PGM=INMV3
00030 //STEPLIB DD DSN=FAA130.INMLIB.LIB,DISP=SHR
00040 //FT02F001 DD DSN=FAA130.INMDAT.DATA(INMINP),UNIT=SYSTS,DISP=SHR
00050 //FT03F001 DD DSN=FAA130.INMUDB.DATA,UNIT=SYSTS,DISP=SHR
00060 //FT32F001 DD DSN=&&MGRD,UNIT=SYSTS,
00070 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00080 //FT06F001 DD SYSOUT=A
00090 //FT08F001 DD DSN=FAA130.PLTFIL.DATA,DISP=(OLD,KEEP),
00100 // UNIT=2400-4,DCB=DEN=2,LABEL=(1,NL),VOL=SER=W33034
00110 //FT09F001 DD DSN=FAA130.INMLOC.DATA,UNIT=SYSTS,DISP=SHR
00120 //FT33F001 DD DSN=&&MPTS,UNIT=SYSTS,
00130 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00140 //FT10F001 DD DSN=&&MPRO,UNIT=SYSTS,
00150 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(100,10),RLSE)
00160 //FT11F001 DD DSN=&&MCP,UNIT=SYSTS,
00170 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00180 //FT12F001 DD DSN=&&MRW,UNIT=SYSTS,
00190 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(100,10),RLSE)
00200 //FT13F001 DD DSN=&&MTRK,UNIT=SYSTS,
00210 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00220 //FT14F001 DD DSN=&&MAC,UNIT=SYSTS,
00230 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00240 //FT15F001 DD DSN=&&MAP,UNIT=SYSTS,
00250 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00260 //FT19F001 DD DSN=&&MMOD,UNIT=SYSTS,
00270 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00280 //FT17F001 DD DSN=&&MNC,UNIT=SYSTS,
00290 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00300 //FT18F001 DD DSN=&&MTM,UNIT=SYSTS,
00310 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(100,10),RLSE)
00320 //FT16F001 DD DSN=&&MPF,UNIT=SYSTS,
00330 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(100,10),RLSE)
00340 //FT20F001 DD DSN=&&MREF,UNIT=SYSTS,
00350 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(100,10),RLSE)
```

Figure 18

IBMMEX (MODEL PROGRAM EXECUTION)

(Part 1 of 2)

```
00360 //FT27F001 DD DSN=&&MPER,UNIT=SYSTS,
00370 // DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),SPACE=(6160,(100,10),RLSE)
00380 //FT22F001 DD DSN=FAA130.MSGRD.DATA,UNIT=SYSTS,DISP=(NEW,CATLG),
00390 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00400 //FT28F001 DD DSN=&&MSR1,UNIT=SYSTS,
00410 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00420 //FT29F001 DD DSN=&&MSR2,UNIT=SYSTS,
00430 // DCB=(RECFM=VBS,LRECL=84,BLKSIZE=88),SPACE=(88,(7000,700),RLSE)
00440 //FT34F001 DD DSN=&&MCON,UNIT=SYSTS,
00450 // DCB=(RECFM=VBS,LRECL=172,BLKSIZE=176),SPACE=(176,(3500,350),
00460 // RLSE)
00470 //FT31F001 DD DSN=&&MFTS,UNIT=SYSTS,
00480 // DCB=(RECFM=VBS,LRECL=2004,BLKSIZE=2008),SPACE=(2008,(500,50),
00490 // RLSE)
00500 //FT07F001 DD DSN=&&MURN,UNIT=SYSTS,
00510 // DCB=(RECFM=FB,LRECL=132,BLKSIZE=132),SPACE=(132,(100,10),RLSE)
00520 //FT30F001 DD DSN=&&MSR3,UNIT=SYSTS,
00530 // DCB=(RECFM=VBS,LRECL=1160,BLKSIZE=1164),SPACE=(1164,(500,50),
00540 // RLSE)
00550 //FT04F001 DD DSN=&&MSR4,UNIT=SYSTS,
00560 // DCB=(RECFM=VBS,LRECL=1160,BLKSIZE=1164),SPACE=(1164,(500,50),
00570 // RLSE)
```



Figure 18

IBMMEX (MODEL PROGRAM EXECUTION)

(Part 2 of 2)

STEP 5. Execute a sample Census Filter run by executing IBMCEX with parameters as included in the JCL stream. This will result in the use of a sample input file called INMCIP. The output file (INMLOC) created by this run should be used as input to the Model Program. The output expected from this run is as shown below.

```
THE FOLLOWING STATES ARE INCLUDED IN THE CENSUS WINDOW
        NEW YORK
        NEW JERSEY
        PENNSYLVANIA
        DELAWARE
        MARYLAND
3422043 PEOPLE WITHIN THE CENSUS WINDOW
1139448 RESIDENCES WITHIN THE CENSUS WINDOW

135753  RECORDS WERE READ FROM THE CENSUS TAPE
  3594  RECORDS WERE EXTRACTED
```

A general flow diagram of execution of IBMCEX is shown in Figure 19.

STEP 6. Execute a sample Model Program run as follows:

a. If no plotter is available, modify the sample user input file INMINP so that it contains no requests for plots within the PROCESS section. In other words, delete the following line:

```
PLOT  SIZE  11  8.5  SCALE  12000
```

b. Execute IBMMEX with parameters as included in the JCL stream. This will result in the use of the sample input file INMINP and the filtered census file INMLOC which was produced in STEP 5. The output from this run should be identical to the sample output on file #10 of the release tape.

A general flow diagram of execution of IBMMEX is shown in Figure 20.

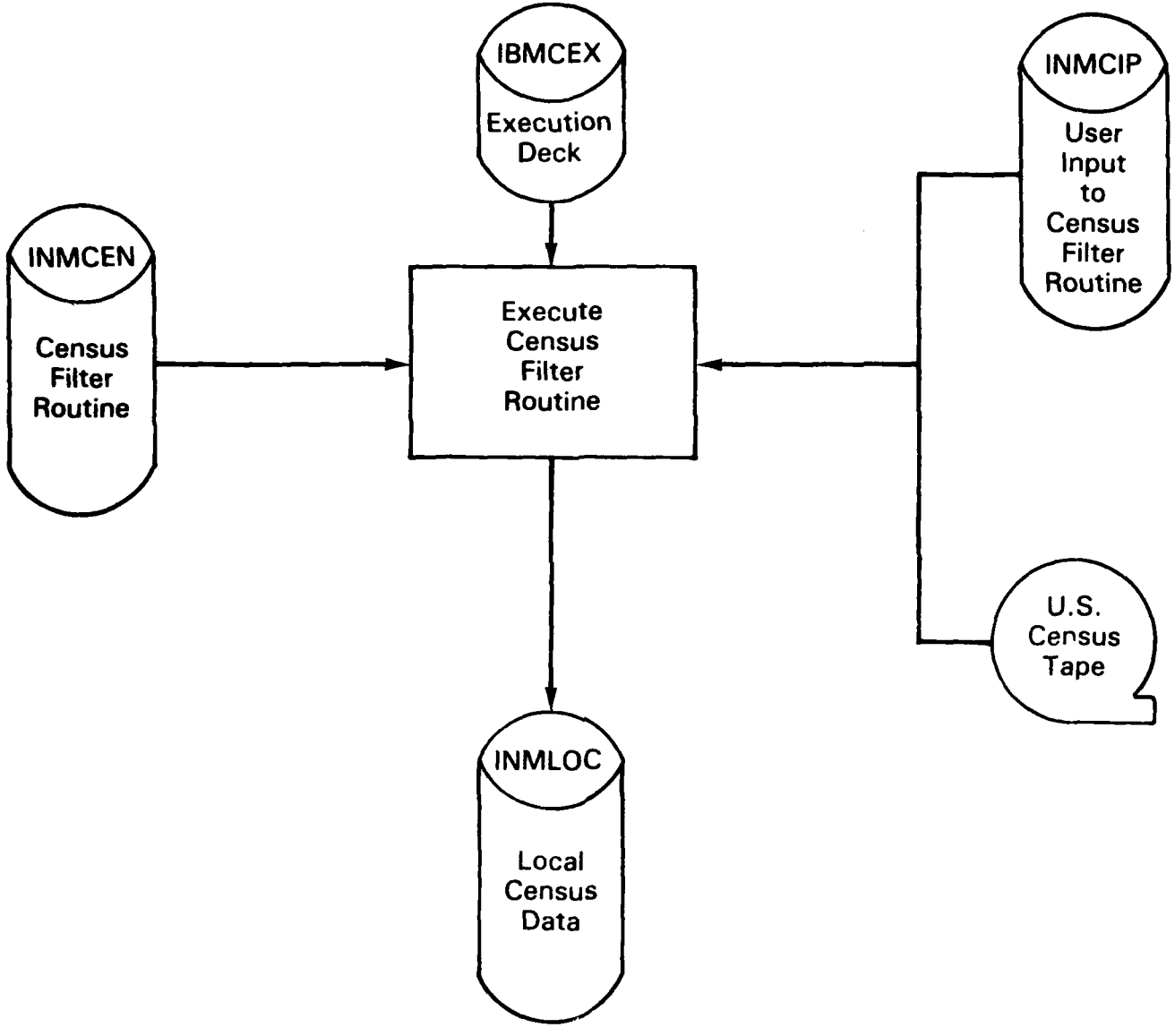


Figure 19

GENERAL FLOW DIAGRAM IBM CENSUS FILTER EXECUTION

Figure 20

## 5.4 EXECUTION PROCEDURES

After the installation process has been completed successfully, the user must accomplish the following steps in order to execute the Integrated Noise Model using other than the sample input data provided on the release tape:

a. Determine the geographic coordinates of the window to be used to extract data from the Census Tape. The window coordinates are defined below:

window lower left longitude
window lower left latitude
window upper right longitude
window upper right latitude.

Each point must be given in degrees, minutes and seconds, with East longitudes and North latitudes being positive degrees and West longitudes and South latitudes being negative degrees. These values must be placed on the census input file in 4(F5.0, F3.0, F4.1) format. Identify the name of the census input file.

It is suggested that a window covering 15 miles in each direction from the airport center be used to obtain a reasonable area of impact. The value of 15 miles is roughly .25 degrees or 15 minutes of latitude or longitude within the U. S.

b. In IBMCEX in line 50 change "INMCIP" to the appropriate file name for the census input file and in line 90 change "INMLOC" to the file on which the local Census Data is to reside. Then, execute the Census Filter Routine by submitting the revised IBMCEX file. If an appropriate window has been selected, this routine will not need to be executed again for the given airport. However, if a study is done for another airport, a local census file for that airport must be created.

c. Using the instructions given in the User's Guide, generate the required input data for the model. Identify the name of the input file to be used.

d. Determine the input and output files required for the user input file just created. Table 5 describes all of the possible files and indicates when they are required.

e. Change the JCL file IBMMEX to reference the appropriate files.

1 - In line 40 change "INMINP" to the appropriate file in which the user input data reside.

2 - If FT09F001 is required, in line 110 change "INMLOC" to the appropriate name for the local Census Data. If FT09F001 is not required, delete line 110.

3 - If FT21F001 is required, add after line 110 the lines

```
00111 // FT21F001 DD DSN=FAA130.MOGRD.DATA,
00112 // UNIT=SYSTS, DISP=(NEW, CATALG),
00113 // DCB=(RECFM=VBS, LRECL=84, BLKSIZE=88),
00114 // SPACE=(88, (7000,700, RLSE))
```

4 - If FT22F001 is required, in line 380 change "MSGRD" to the appropriate file name for the grid file to be saved. If FT22F001 is not required, delete lines 380 and 390.

5 - If FT08F001 is required, in line 100 substitute the appropriate reel numbers for W33034. If FT08F001 is not required, delete lines 90 and 100.

f. Execute the Model Program by submitting the corrected IBMMEX file.

## 5.5 IBM REFERENCE MANUALS

The following United Computing Systems, Inc. (2525 Washington, Kansas City, Missouri 64108) manuals may be useful in installing the model on the CDC computer:

APEX/SL BATCH Reference Manual
Order Number 6S32-879

APEX/SL FORTRAN Reference Manual
Order Number 6L2-1078

TABLE 5

IBM INPUT AND OUTPUT FILES FOR THE MODEL PROGRAM

| FILE | TYPE | DESCRIPTION | COMMENTS |
|---|---|---|---|
| FT02F001 | Input | User Input Data | Always required; created by user. |
| FT03F001 | Input | Unformatted Data Base | Always required; created during installation. |
| FT09F001 | Input | Local Census Data | Required only if IMPACT Reports are requested; created by executing Census Filter Routine. |
| FT21F001 | Input | Old Grid File | Required only if retrieving contour data from an old file; created by saving contours during a previous run. |
| FT22F001 | Output | Saved Grid File | Required only if saving contours. |
| FT08F001 | Output | Plotter Tape for PREVIEW and PLOT | Required only if requesting either PREVIEW or PLOT. The model uses the same tape for both types of plots but the model can be changed by the maintenance programmer to produce separate plotter tapes. Some systems allow FT08F001 to be a disk file rather than a tape. |

The following International Business Machines (IBM) Corporation manuals may be useful in installing the INM model on the IBM Computer:

OS/VS Message Library: VS2 System Codes
Order Number GC38-1008

OS/VS Message Library: VS2 System Messages
Order Number GC38-1002

OS/VS2 MVS UTILITIES
Order Number GC26-3902

OS/VS2 Utilities Messages
Order Number GC26-3920

OS/VS Linkage Editor and Loader
Order Number GC26-3813

OS/VS Message Library: Linkage Editor and Loader Messages
Order Number GC38-1007

IBM System 1360 Operating System: FORTRAN IV (G and H) Programmer's Guide
Order Number GC28-6817

IBM SYSTEM/360 and System/370 FORTRAN IV Language
Order Number GC28-6515

OS/VS2 MVS JCL
Order Number GC28-0692.

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